

DIVISION OF FOREST PEST CONTROL



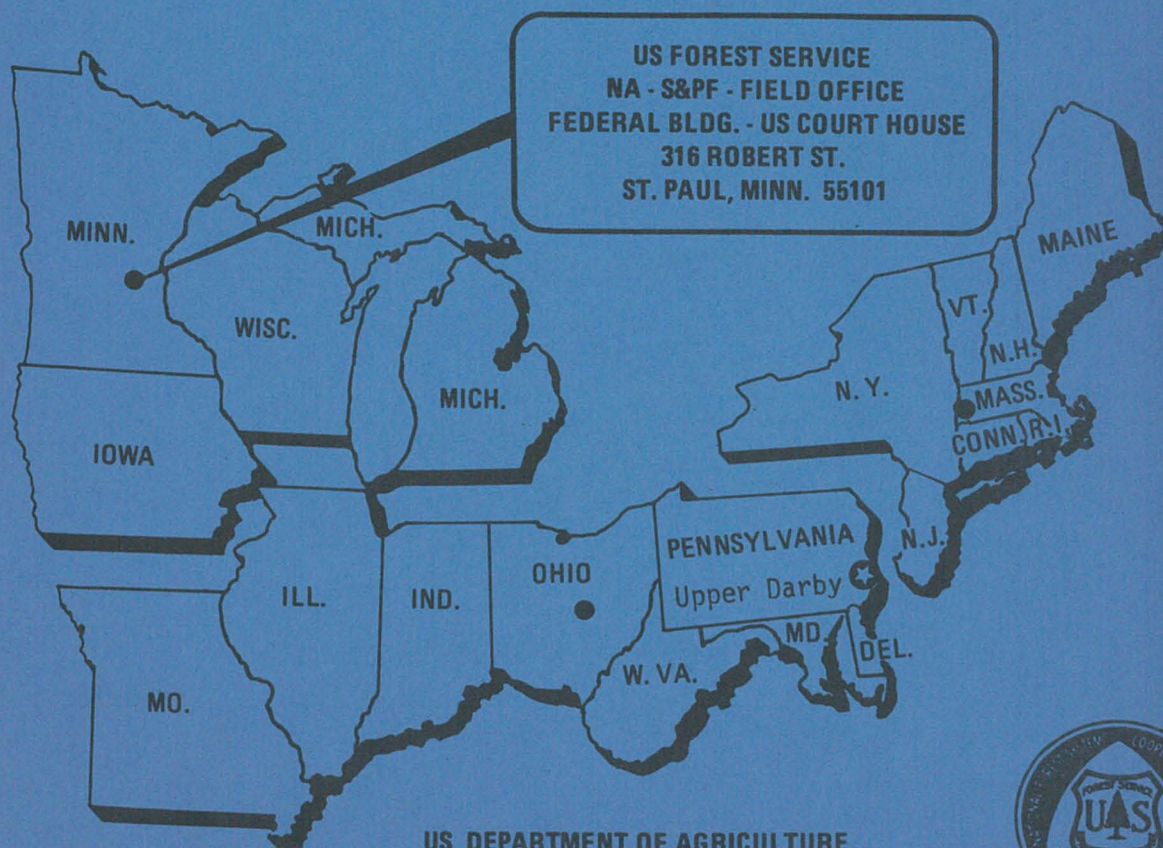
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SCATTERED SPRUCE BUDWORM OUTBREAKS ON
THE HIAWATHA NATIONAL FORESTS - 1970

By Glen Erickson and Imants Millers



US DEPARTMENT OF AGRICULTURE
FOREST SERVICE



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ABSTRACT

Light to moderate spruce-fir defoliation was found in scattered locations on the East Unit of the Hiawatha National Forest, located in Upper Michigan. The egg-mass survey results indicate continued moderate defoliation.

INTRODUCTION

Blais (1968) reviewed spruce budworm, Choristoneura fumiferana (Clem.), history during the last 250 years. He considered the spruce budworm as one of the most devastating insect pests of spruce-fir forests in North America. The last recorded spruce budworm outbreak in the Upper Peninsula of Michigan occurred in the Keweenaw County in 1954-55 (Annon., 1955). The outbreak was short-lived and no tree mortality was reported. The present outbreak in Upper Peninsula probably began in 1968, or a year earlier, but it was first reported by the St. Ignace Ranger District in 1969. This report covers the results of an aerial survey and egg-mass survey for 1970.

BIOLOGICAL REVIEW

Causal Agent

Spruce budworm, Choristoneura fumiferana (Clem.)

Host Trees Attacked

Balsam fir, Abies balsamea (L) Will. White spruce, Picea glauca (Moench.) Voss.

Type of damage

Damage occurs from larval feeding on needles and mining of buds. Current foliage and buds are damaged first. Older foliage is damaged after the preferred food supply is exhausted. Severe defoliation for 3 or more years in succession may result in tree mortality (Bean and Waters, 1961).

Ecological Considerations

Many parasites, predators and disease attack the spruce budworm, but their role in outbreak suppression appears to be minor (Bean and Waters, 1961; Morris et al., 1963). Reduction of acceptable food and adverse weather are the probable causes of outbreak collapses. None of these factors were measured in the present outbreak.

SURVEY METHODS

An aerial reconnaissance was made in late July, 1970. The flight was made in a twin engine Aero-Commander at 120 mph airspeed and about 1000 ft. above the tree tops. The flight was in parallel lines, north to south, spaced about 6 miles apart. Two observers sketch-mapped spruce-fir defoliation using the following classes:

None - no visible defoliation

Light to Moderate - tree canopy mainly green, but
browning or thinning of foliage
perceptible

Severe - most of the trees with brown, or naked, tops

The ground survey was done in early August. Branch samples were collected from 11 plots scattered in spruce-fir type on the Soo and St. Ignace Ranger Districts. Each plot consisted of three 15 inch twigs cut from mid-crown of each of 3 dominant/co-dominant fir, or spruce (9 twigs per plot). The number of egg-masses were counted and the defoliation estimated by a trained crew at Toumey Nursery, Watersmeet, Michigan.

RESULTS

Light to moderate spruce-fir defoliation was found mainly on the St. Ignace Ranger District and in an adjoining township on the Soo Ranger District (Fig. 1). Mapping generally was difficult because the host trees are in scattered small clusters, and the defoliation was not sufficiently severe to show up clearly. The outlined area should be considered as the parameter of the outbreak area. Defoliation data from the ground surveys confirms the major outbreak area as seen from the air (Table I). Additional information was also recorded for spruce-fir areas further north on the Soo Ranger District. The egg-mass data indicate the spruce budworm defoliation probably will be present for another year, and it may spread over a larger area.

In the past, spruce budworm outbreaks in scattered host types have not persisted very long (Beckwith and Ewan, 1956; Millers and Erickson, 1970). If the assumptions used elsewhere apply on the Hiawatha National Forest, then 1971 defoliation should not exceed moderate levels. Tree mortality may occur locally,

but wide spread elimination of the spruce-fir type is not expected.

The Keweenaw outbreak of 1954-55 was reportedly brought under control by a vigorous program to eliminate mature and over-mature balsam fir and white spruce. Where possible, this method of silvicultural management is recommended for the Hiawatha outbreak.

TABLE I. Spruce Budworm Egg-mass Counts and Defoliation on the Hiawatha National Forest, East Unit - 1970

<u>Location</u>			Host Species	No. E.M. Per Plot	Percent and Defoliation
T	R	S			
44N	5W	24	WS	0	0
44N	4W	23	WS	1	15
46N	4W	33	WS	0	15
47N	3W	24	WS	0	5
44N	5W	5	WS	6	20
43N	2W	2	WS	8	15
42N	4W	24	WS	1	15
43N	3W	20	BF	0	10
43N	5W	24	WS	2	0
42N	5W	15	WS	2	10
41N	5W	14	WS	0	0

RECOMMENDATION

The forest manager should consider commercial cutting of mature and overmature balsam fir and spruce. No chemical suppression is feasible because of light to moderate budworm infestation over a large area of scattered host type.

HIAWATHA NATIONAL FOREST

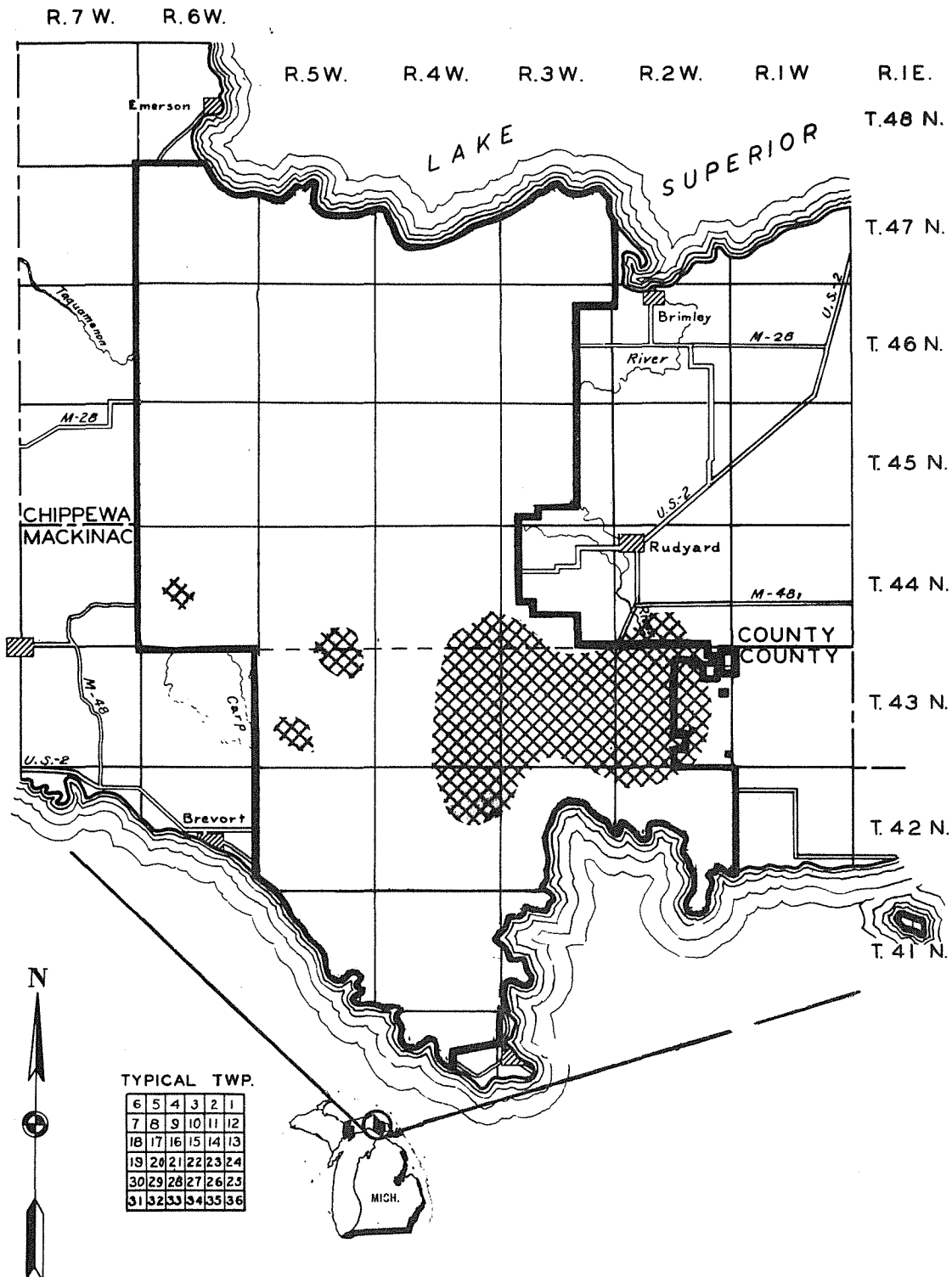


Fig. 1. Spruce Budworm Defoliation On the Hiawatha National Forest - 1970

Light to Moderate

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